Kentucky
Agricultural Experiment Station

University of Kentucky

A Study of Farm Organization and Management in Mason and Fleming Counties.

BULLETIN NO. 253

Lexington, Ky.

June, 1924

(37)

EXPERIMENT STATION STAFF

BOARD OF CONTROL

Richard C. Stoll, Chairman, Lexington, Ky.
H. M. Froman, Lexington, Ky.
R. G. Gordon, Louisville, Ky.
Rainey T. Wells, Murray, Ky.

Frank L. McVey, President — Thomas P. Cooper, Dean and Director

ADMINISTRATION

T. P. Cooper, Director
D. H. Peak, Business Agent
O. L. Ginocchio, Secretary.

AGRONOMY

George Roberts, Head
E. J. Kinney, Assoc. Agronomist
P. E. Karraker, Asst. Agronomist
J. F. Freeman, Supt. Exp. Fields
W. D. Valleau, Plant Pathologist
E. N. Fergus, Asst. Agronomist
J. B. Kelley, Agricultural Engineer
E. M. Johnson, Asst. in Agronomy

ANIMAL HUSBANDRY GROUP

E. S. Good, Chairman
J. J. Hooper, Dairy Husbandry
W. S. Anderson, Horses
L. J. Horlacher, Beef Cattle, Sheep
E. J. Wilford, Swine, Meats
W. J. Harris, Beef Cattle
J. H. Martin, Poultry
J. W. Nutter, Dairyman
Amanda Harms, Asst. Path. Bact.
W. W. Dimock, Head, Vet. Science
A. J. Steiner, Asst. Veterinarian
Ethel M. Snyder, Lab. Asst.
E. A. Caslick, Assistant
D. A. Sanders, Assistant

CHEMISTRY

A. M. Peter, Head
S. D. Averitt, Chemist
O. M. Shedd, Chemist
G. D. Buckner, Chemist
J. S. McHargue, Chemist
W. D. Iler, Asst. Chemist
D. J. Healy, Bacteriologist

CREAMERY LICENSE SECTION

J. D. Foster, Inspector in Charge

ENTOMOLOGY AND BOTANY

H. Garman, Head
Mary L. Didlake, Assistant Ent.
H. H. Jewett, Research Asst. Ent.
Carrie Lee Hathaway, Seed Analyst
Marie Jackson, Seed Analyst
Jessie Terry, Seed Analyst
R. A. Stevenson, Inspector

FARM ECONOMICS

W. D. Nicholls, Head
O. B. Jesness, Chief, Sec. Markets
Dana G. Card, Asst. Marketing
J. B. Hutson, Farm Management
*J. C. Melvin
*E. L. Langsford

FEED CONTROL

J. D. Turner, Head
H. D. Spears, Chemist
W. G. Terrell, Inspector
Fred Fitschen, Inspector

FERTILIZER CONTROL

H. E. Curtis, Head
Harry Allen, Chemist
Lelah Gault, Asst. Chemist
Roger W. Jones, Inspector

HORTICULTURE

C. W. Mathews, Head
A. J. Olney, Asst.

PUBLIC SERVICE LABORATORY

L. A. Brown, Head
E. J. Gott, Bacteriologist
A. L. Meader, Asst. Chemist
Ethel L. Hopphan, Serologist
James H. Martin, Asst. Chemist
W. J. Nungester, Asst. Bacteriologist

*Assigned by the U. S. Department of Agriculture.

BULLETIN NO. 253

A Study of Farm Organization and Management in Mason and Fleming Counties.

By W. D. NICHOLLS, C. U. JETT, and Z. L. GALLOWAY.*

SUMMARY.

The study upon which this report is based was made during the spring and summer of 1923. The period covered was the farm year of 1922. Two hundred and forty-one farms are included in the analysis. The region involved is Mason and Fleming counties and most of the farms are located in the half of Mason County bordering Fleming and the half of Fleming County bordering Mason. The farms are typical of the more rolling section marking the outer border of the Central Kentucky Bluegrass Region.

The objects of the study were:

(1) To determine the status of the farming business of this typical agricultural region particularly as regards the profits or loss sustained by farmers during the post-war deflation period.

(2) To determine the factors which influence farm profits.

(3) To discover farms which made profits and to study closely the organization and management of such farms with the view of bringing out the factors which were responsible for their success.

(4) To make available the facts brought out for farmers in the section studied and in other sections having similar conditions, for their guidance in making changes in the organization and management of their farms for greater efficiency and profits.

*Acknowledgments: Special acknowledgment is due Mr. C. A. Mahan, State Leader of County Agents, and to Professor T. R. Bryant, Assistant Director of Agricultural Extension for their valuable cooperation which made possible the collection of the field data upon which this bulletin is based. Acknowledgment is due Mr. H. R. Brown and Miss Nannette Arkle who assisted in tabulating the data.

The figures used in the analysis were obtained by personal visits to farmers and show the net earnings made by each farmer for his year's work and management. See pages 41-43.

The study shows a marked difference in the profits or earnings of different farmers in this region. The average farmer earned $1,029 for his year's work and management while the best 15 farmers earned $3,203. In each case this was in addi-

Fig. 1. Typical farm home in the area studied.

tion to interest at 6% on the investment in the farming business. Interest on the value of the operator's dwelling was not included, nor were depreciation, repairs and other expenses on the operator's dwelling. See page 43.

The net earnings included the value of milk, butter, eggs, meat, corn meal, garden produce and other perquisites furnished by the farm for the living of the operator's family. The average value of these at farm prices was $332 per farm. For the best 15 farms their value was $422.

The average total receipts were $3,714 per farm, this including the value of the cropper's share of tobacco and other

crops raised on shares. The average total expenses were $1,941, which figure includes the value of the cropper's share of crops charged as "cropper labor." Expenses also include depreciation on farm buildings and machinery $226, and unpaid family labor $163, and decrease in feed and supplies $75.

The average total receipts for the best 15 farmers were $7,124 and the average total expenses $3,038.

The receipts per 100 acres for the average of the 241 farms were $2,443 and for the best 15, $3,851. The expenses per 100 acres were $1,277 for the average and $1,642 for the best 15 farms.

The 241 farms had an average area of 152 acres and an average investment of $17,928. This did not include the value of the operator's dwelling.

The factors which were most influential in determining profits in this farming area were:

Crop yields per acre.
Returns per head of live stock.
Volume of sales per 100 acres operated.
Efficiency in performing the farm work.
Control of expenses in relation to receipts.
Quality of tobacco.

A diversity of crops and live stock was also shown to be important. In general the farms which were strong in all or a majority of these factors were profitable.

The business organization of typical successful farms of the area is shown in Part III.

METHOD OF THE STUDY.

The survey method of analyzing the farm business was used in this study. The figures were secured by personal interviews with the farmers, from each of whom was obtained a record of farm receipts and expenses, inventories of all classes of farm property, acreages of various crops grown and the value of those things furnished by the farm for the family living. When the figures for the records were brought together and summarized

they showed the net earnings of the farmer for the year and also such other factors as crop yields, productivity per man and other factors which indicated the efficiency of the farm and its operator. In a considerable number of cases the figures were taken from complete book records, in others from partial records, while in others they represented careful estimates. It has been demonstrated that farm profits and other similar data can be de-

Fig. 2. Modern barn on one of the farms studied.

termined with accuracy by the survey method if the right questions are asked and if the questions as to receipts, expenses, etc., are asked item by item.

The records were secured by men technically trained in agriculture and accounting and familiar with the practical phases of farming. The records taken during the day by the field men were copied on summary sheets and checked at night. If any errors or omissions appeared the farmers were interviewed again and proper corrections made. The field and summary record sheets were brought into the office, rechecked, analyzed, classified and various correlation tables worked out.

In analyzing the records the averages of the various factors were obtained for all farms. The same factors were then averaged for the most profitable 15 farms, the figures being placed in parallel columns on a factor sheet. Then there was sent to each farmer a sheet showing his individual factor set opposite the same factors for all the farms and the most profitable 15 farms. This served to show him his factors of organization and management compared with the average and with the best farms in his section.

Part I—Factors Influencing Farm Profits in the Area.

MEASURING THE EFFICIENCY OF FARMERS.

One of the cardinal objects of this farm business analysis was to determine the net earnings obtained by each operator for his year's labor and management. This is regarded as an index of his efficiency and success as a farmer.

Table 1.—Business Statement of 241 Farms and the Best 15 Farms.

	Average of 241 Farms	Average of Best 15 Barms
1. Farm investment (operator's dwelling not included)	$17,928	$21,753
2. Farm receipts	3,714	7,124
3. Farm expenses	1,941	3,038
4. Net receipts (line 3 subtracted from line 2)	1,773	4,086
5. Interest on farm investment at 6%	1,076	1,305
6. Farmers' earnings for labor and management (line 5 subtracted from line 4)	697	2,781
7. Value of perquisites furnished by farm	332	422
8. Total net earnings	1,029	3,203

Table 1 shows a business statement representing averages of 241 farms and the most profitable 15 farms. The average of the 241 farms secured $1,029 earnings which figure includes $332

worth of perquisites furnished by the farm for the family living. The most profitable 15 farms secured an average of $3,203 net earnings of which $422 was the value of perquisites. It will be noted that the receipts of the successful farms are nearly double those of the average of all the farms while the expenses are only about 50% greater, and the net earnings of the most successful 15 farms are more than 3 times the average.

CAPITAL INVESTMENT.

Table 2.—The Amount and Distribution of the Capital on the 241 Farms

	Average of 241 Farms	Per Acre	Per Cent Total Investment
Investment in Land	$13,443	$88.4	64.7
Investment in Dwelling	2,834	18.6	13.7
Investment in Other Buildings	2,293	15.0	11.0
Investment in Machinery	490	3.1	2.4
Investment in Live Stock	1,363	8.9	6.6
Investment in Feed and Supplies	339	2.2	1.6
Total Investment	20,762	136.5	100.0
Total Business Investment	17,928	117.9	86.3

Table 2 shows the amount and distribution of the farm capital. It will be noted that the land represents about two-thirds of the total investment.

FARM RECEIPTS AND EXPENSES.

The sale of crops furnished 61.9% of the total receipts of these farms. Fifty-three and one-tenth per cent of the total receipts came from tobacco. Hogs furnished 15.1% of the total receipts, cattle 15.1%, sheep 3.6%.

The amounts of the various items of expense and the relation of each item to the total expenses are shown in Table 3.

Table 3.—Analysis of Farm Expenses—Average of 241 Farms.

	Amount	Per Cent of Total
Current Expenses	$829	42.7
Cropper Labor	604	31.1
Share Rent	44	2.3
Depreciation	226	11.6
Unpaid Family Labor	163	8.4
Decrease in Feed and Supplies	75	3.9
Total Expenses	1,941	100.0
$60 Decrease in Live Stock.		

Current expenses made up 42.7% of the total expenses and included hired labor, purchased feeds and seeds, repairs of farm equipment, taxes, insurance on farm property, and similar items. Cropper labor was the value of the share of the crop grown by croppers. The same item was credited in the list of receipts. Share rent paid by operators for the use of additional land amounted to 2.3%, and depreciation 11.6%. Unpaid labor of members of the farm family other than the operator was charged as an expense at a figure representing what it would cost to hire the same work done and represented 8.4% of the total expenses. Decreased inventories of feed and supplies was regarded as an expense and represented 3.9% of the total expenses.

Table 4.—Analysis of Current Expenses—Average of 241 Farms.

	Amount of Total Expense	Per Cent of Current Expenses
Hired labor	$184.4	22.3
Board or rations	16.9	2.0
Machine repairs	32.6	3.9
Tenant house repairs	2.3	.3
Other building repairs	18.8	2.3
Fence repairs	27.2	3.3
Feed, roughage	9.7	1.2

TABLE 4—Continued.

	Amount of Total Expense	Per Cent of Current Expenses
Feed, grain	120.3	14.5
Pasture	.8	.1
Silo filling	3.2	.4
Horse shoeing	16.6	2.0
Veterinary, medicine, etc.	5.9	.7
Breeding fees	3.1	.4
Registry fees	.8	.1
Seeds	70.7	8.5
Fertilizer: wage land	15.3	1.9
Fertilizer: cropper land	.9	.1
Spray material	1.2	.1
Twine	3.8	.5
Threshing	15.2	1.8
Baling and wire	5.0	.6
Other machine work hired	.6	.1
Fuel and oil for farm work	4.0	.4
Auto for farm use	10.7	1.3
Telephone	6.9	.8
Insurance	17.2	2.1
Taxes	194.8	23.5
Cash rent	36.2	4.4
Other expenses	3.9	.4
Current expenses	$829.0	100.0

Table 4 gives an analysis of the items making up the current expenses for the 241 farms. It will be noted that hired labor and taxes were the largest single items, the former being 22.3% and the latter 23.5% of the total current expenses. The other large items of expense were purchased feeds 15.7%, seeds 8.5%, repairs 9.8%.

FACTORS INFLUENCING FARM PROFITS.

The fact has been brought out that the average earnings of the most efficient 15 farmers in the group studied were more than 3 times those of the average of all the farmers. An attempt was made to ascertain the reasons for this difference.

There are numerous factors which may affect farm profits. The farms in the study were classified on the basis of the various factors which might have an effect upon their profitableness.

LABOR EFFICIENCY.

One of the factors determined for each of the farms was the total acres of crops raised, the number of live stock kept, the number of workers, including the operator and members of the family, who cared for the crops and stock, and the total number of months the labor was employed. The months of labor divided by twelve gave the "man equivalent" or the "man years" of labor for the farm.

In previous studies the average hours of labor required for producing various crops and caring for various classes of live stock under conditions similar to those prevailing in the Mason-Fleming area have been determined and are shown in Table 5. Here the various classes of farm labor have been reduced to a comparable unit, making it possible to compare the efficiency of different farms in labor accomplishment. Under average methods of intensity and efficiency a work unit represents approximately a ten-hour day. Work units are not a measure of how hard the farmer has worked but of what he has accomplished.

The term "productive work unit" is used to designate work spent in the production of crops or the production of stock or stock products for sale. Work spent on caring for work horses, repairing machinery, or other work connected with the up-keep of the farm or equipment is not included under the term "productive work units."

Table 5.—Approximate Work Units Needed for Various Farm Enterprises.

Enterprises	Man Labor Units	Horse Work Units
Production of Crops.	Per Acre	Per Acre
Tobacco (Burley)	36.3	8.9
Corn (Shocked and put into crib)	4.6	4.4
Corn (Husked from stalk)	3.0	5.0
Corn (Hogged down)	2.4	3.5
Silage (Corn)	6.0	7.0

TABLE 5—Continued.

	Man Labor Units	Horse Work Units
Wheat	1.2	1.6
Rye (Thrashed)	1.3	2.0
Rye (Cut and fed as hay)	0.9	1.3
Rye (Pastured or turned under)	0.2	0.6
Oats (Thrashed)	1.2	1.4
Oats (Fed in bundles)	1.2	2.0
Meadow hay	1.1	0.7
Bluegrass	.3	.2
Cowpeas and soybeans	1.8	3.0
Melons	20.0	5.0
Apples (Little care)	3.0	1.0
Apples (Given good care)	15.0	5.0
Berries	20.0	5.0
Grapes	10.0	2.0
Peanuts	5.0	5.0
Garden	12.0	6.0
Caring for Stock (Per year)	Per Animal Unit*	Per Animal Unit*
Ordinary milk cows on farm	12.3	1.5
Dairy cows (Including retail milk)	18.3	6.2
Dairy cows (Including wholesaling milk)	15.0	2.0
Beef cattle or general stock cattle	1.0	0.9
Horses	8.0	0.5
Sheep	2.3	0.05
Swine	1.1	0.02
Poultry	15.0	2.0

*An animal unit is the equivalent of a 1000-lb. animal. It is represented by 1 cow or horse, 5 hogs, 7 sheep, or 100 hens.

The figures in Table 5 were applied for each farm to the crops and live stock of that farm and the total hours determined. This total divided by the "man equivalent" showed the productive work units accomplished per man. The average farm operator secured 203.26 productive work units per man while the most profitable 15 farms secured 258.01 units per man.

Table 6.—Relation of Productive Work Units Per Man to Net Earnings*

Productive Work Units Per Man	No. Farms	Average Productive Work Units Per Man	Farmer's Net Earnings for Year
Below 149	48	122.00	$191
149.1—185	47	169.31	1,028
185.1—226	60	204.11	1,218
226.1—267	37	249.35	1,318
Over 267	49	285.72	1,412
All farms	241	203.26	1,029

*The term "productive work unit" is used to designate work spent in the production of crops, or producing stock or stock products for sale. Work spent in caring for work-horses, repairing machinery, or other work connected with the up-keep of the farm or equipment is not included under the term "productive work units."

Table 6 shows the marked influence which the productivity of the farm workers had on the profits of these farm operators. Thus the group of farmers who secured the highest number of productive work units per worker earned over 7 times as much for their year's work as those who secured less than 149 units.

The averages of the crop yields of the various groups of farms were determined and these indicated that the farmers who accomplished the greatest amount of labor per man secured crop yield 97% as good as the average yield for all the farms. In other words the greater labor efficiency attained was not at the expense of good yields per acre.

There was an average man equivalent of 1.46 for the group of farms showing the best labor efficiency. That is to say the work was done by the operator with additional help which represented about 6 months' work of a hired man.

The 49 farms which showed the highest labor efficiency were subdivided into two groups, one whose expenses per $100 of receipts were above the average, the other with that factor below the average. The latter group represented farms which were efficient in the use of labor and in the control of expenses. They secured average net earnings of $1,719 or nearly ¾ more than the average for all the farms.

The 49 farms which were most efficient in the use of labor were again subdivided into two groups, one representing farms whose crop yields were above the average, the other with yields below the average. Here again the added factor of efficiency was reflected in a considerable increase in profits, the average net earnings for the 20 farms which were strongest in labor efficiency and above the average in crop yields being $1,704 as compared with $1,029 for the average of all farms.

VOLUME OF SALES PER 100 ACRES.

Another factor which exerted a marked influence on the profitableness of these farms was the volume of sales per 100 acres. The receipts per 100 acres was $2,443 for the average farm operator, while the most successful 15 operators secured $3,851. The farms were classified on this factor and the results are shown in Table 7.

Table 7.—Relation of Receipts Per 100 Acres Operated to Net Earnings

Receipts Per 100 Acres Operated	No. Farms	Average Receipts Per 100 Acres Operated	Farmer's Net Earnings for Year
Less than 1700	50	$1,366	$109
1700.1—2175	46	1,938	885
2175.1—2650	47	2,379	988
2650.1—3125	32	2,850	1,194
Over 3125	66	3,850	1,797
All farms	241	2,443	1,029

The size of the 5 groups were 175.2, 174.0, 150.4, 133.9, and 130.6 acres respectively. The average value per acre of land (value of buildings excluded) was $75, $74, $98, $97 and $103 respectively. The average expenses per 100 acres for the 5 groups were $882, $1,055, $1,198, $1,411 and $1,876 respectively.

CROP YIELDS AS A FACTOR IN PROFITS.

In nearly all economic studies of the farming business the fact has been brought out that good crop yields are one of the major factors influencing profits. The figures obtained in this

study indicate the large importance of that factor in the Mason-Fleming area.

In order to have a fair comparison of the crop production of different farms it is necessary to have a unit measure. The crop index furnishes such a measure. It states the composite yields of all crops on a particular farm in terms of the community average, the latter being considered 100. Suppose a given farmer had:

20 acres of corn yielding 50 bu. per acre or a total of 1,000 bu.
10 acres of tobacco yielding 1,500 lbs. per acre or a total of 15,000 lbs.
30 acres of wheat yielding 10 bu. per acre or a total of 300 bu.
30 acres of hay yielding 1½ tons per acre or a total of 45 tons.

90 acres total acreage.

Suppose the average yield per acre of all farms in the community were corn 40 bu., tobacco 1,000 lbs., wheat 15 bu., hay 1 ton. Then to produce

1,000 bu. of corn would require	25 acres	(1,000 ÷ 40)
15,000 lbs. of tobacco would require	15 acres	(15,000 ÷ 1,000)
300 bu. of wheat would require	20 acres	(300 ÷ 15)
45 tons of hay would require	45 acres	(45 ÷ 1)
Or a total of	105 acres	

The crop index of this farm would be determined by dividing 105 acres, the average acreage required to produce the amounts of the crops produced on this farm by the actual acreage used on this farm to produce those amounts. This gives 116.7 which means that the yields of the crops on this farm are 116.7% of those of the community. That is the crop index of the farm is 116.7.

The yields of the most important crops for the average farm and for the best 15 farms for the year of the study were as follows:

	Average of 241 Farms	Average Best 15 Farms
Yield of corn per acre	35.2	41.3
Yield of tobacco per acre	1,094.1	1,192.3
Yield of wheat per acre	12.4	15.4
Yield of hay per acre	1.4	1.3
Yield of all crops (Community average =100%)	100%	105%

The farms were classified on the basis of crop yields and the effect observed on the average net earnings of the operators. The results are shown in Table 8 which brings out the fact that there was a consistent increase in net earnings as the crop yields increased.

Table 8.—Relation of Crop Yields to Net Earnings.

Crop Yield	No. Farms	Average Crop Yield	Farmer's Net Earnings for Year
Under 75	40	64	$661
75.1—88	58	83	987
88.1—101	60	95	1,059
101.1—114	36	107	1,094
Over 114	47	127	1,318
All farms	241	100	1,029

A few farmers in the area carried their efforts to secure high crop yields to a point where profits were reduced but there were not enough of these in the group of farmers securing the highest yields to have a marked effect on the average.

Large yields per acre do not necessarily pay. Inexperienced persons are inclined to overestimate the importance of large yields. Successful farmers know that economy in the use of teams, labor and machinery is as necessary as economy in the use of land. It is true that good crop yield is usually one of

the most important feators in reducing cost of production, thereby increasing profits. Very large yields can be secured by using more fertilizer, more labor and more expense in other ways but it is easily possible to go so far in trying to increase yields as to reduce or eliminate profits from the crop. Studies of this question have shown that farmers should use methods which enable them to get 1/5 to 1/4 better yields than their neighbors are getting on the same kind of soil.

Successful farmers are careful not to resort to radical or unduly expensive methods in increasing crop yields. They employ inexpensive means of soil improvement. They make the fullest use of farm manure, litter, weeds and other home-produced sources of organic matter, of legumes and grazing crops. When limestone can be applied at moderate cost it is used upon land which needs it and in most cases results in a marked improvement in crop yields. Over a large part of Kentucky phosphate fertilizers have proved an economical agent for improving yields. Another economical means of increasing yields is the improvement of the physical condition of the fields by laying tile drains in low places, removing stones, stumps and thickets which interfere with crop production. Such work should be done during slack periods especially mild winter weather and other periods when the condition of the soil does not permit field work. By the use of these means it is possible for a farmer to improve a few acres each season with the regular farm labor force and at a very small cost. The ideal of every good farmer should be large crop yields by economical methods.

RETURNS FROM LIVE STOCK.

Since the land in this area is rolling and subject in a marked degree to erosion the most successful farmers keep the greater part of the acreages in grass, thereby necessitating the keeping of live stock for the economic use of the grazing resources of the farm. The analysis of these farm records indicates that one of the major factors influencing farm profits is the returns per

productive animal unit.* The average farmer secured $52.86 receipts per unit of productive live stock, while the best 15 farmers secured $76.03 per head. The average farmer secured $103.60 returns per $100 worth of feed fed and the best 15 farmers $151.19.

Table 9 shows the results of the analysis of the records on the basis of returns per productive animal unit. It will be noted that there was an upward trend in net earnings as the returns per head of live stock increased. One exception to this trend is noted in the third group of farms whose net earnings were somewhat less than the group having a smaller return per head of live stock. There were 27 farmers who secured large crop yields as well as large returns per head of live stock. These made an average of $1,666 net earnings or nearly two-thirds more than the average earnings of all the farmers.

Table 9.—Relation of Returns Per Productive Live Stock Unit to Profits

Returns Per Productive Live-Stock Unit	No. Farms	Average Returns Per Productive Live-Stock Unit	Farmer's Net Earnings for Year
Under $38	48	$29.91	$732
38.1—46	49	42.62	874
46.1—54	53	47.60	823
54.1—62	38	58.19	1,390
Over 62	53	80.88	1,418
All farms	241	52.86	1,029

CONTROL OF EXPENSES AS A FACTOR FOR PROFITS.

The analysis of the business of these farms developed the fact that the effective control of expenses was one of the major factors influencing farm profits in this area during the period under consideration. Out of each $100 of receipts the average farmer laid out $52 for expenses while the best 15 farmers laid

*An "**animal unit**" is a mature cow or horse, or as many smaller animals as require the equivalent feed of a cow or horse. Five hogs, 7 sheep, and 100 hens are considered one unit. Young animals are rated at one-half the unit value of mature animals. In general an animal unit is considered the equivalent of a 1,000 pound animal. The term "**productive animal**" **unit** is used to designate animals which are kept for the purpose of the direct sale of the stock or their products, e. g. beef cattle, hogs, growing colts, etc. Work stock are not counted as productive animal units.

out $42. The striking effect of the control of expenses is shown in Table 10. The group of farms showing the smallest expenses as related to receipts secured the largest net earnings and the earnings decreased as the relative expenses increased.

Table 10.—Relation of Expenses per $100 Receipts to Profits.

Expenses Per $100 Receipts	No. Farms	Average Expenses Per $100 Receipts	Farmer's Net Earnings for Year
$1—$40	52	$31	$1,790
$40.1—$49	46	44	1,530
$49.1—$58	55	52	1,103
$58.1—$67	38	59	746
Over $67	50	75	—78
All farms	241	52.2	1,029

Fifty-two farmers averaged $31 expenditures per $100 of receipts and these secured net earnings of $1,790. This group of farms averaged 121.7 acres in size and had a crop index of 94.

Forty-six farmers averaged $44 expenditures per $100 of receipts and secured $1,530 net earnings. In size they averaged 145.4 acres and in crop index 101.

The fifty-five farms averaging $52 expenditures per $100 in receipts secured $1,103 net earnings, averaged 161.4 acres in size and had an average crop index of 98.

The 38 farms averaging $59 expenditures per $100 of receipts secured $746 net earnings, averaged 158.9 acres in size and had an average crop index of 91.

The 50 farms which averaged $75 expenditures for each $100 of receipts averaged a net loss of $78. They averaged 176.1 acres in size and had an average crop index of 91.

The effective control of expenses was of peculiar significance during the period of post-war deflation covered by this study because most of the products which farmers had to sell would buy a smaller quantity than formerly of the things which farmers usually purchase. Statistics indicate that the purchasing power of farm products was only about three-fourths of the

normal. The degree to which farmers made adjustments of their purchases to conform to this economic condition was reflected in a very marked way in their net earnings.

The farmers who succeeded in controlling expenses did so in various ways the most important of which were as follows:

Hiring less labor and doing more of the farm labor themselves and exchanging labor with neighbors.

Reducing the cultivated acreage leaving the thinner land in grass and clover during the period of low prices for farm products, doing less harvesting of crops and more grazing and hogging down.

Growing more garden produce for the family and more feeds for the work stock.

Doing more of their own repairing, making their own farm gates and similar equipment.

Saving labor by keeping the equipment in good condition so that operations could be done with the least possible lost motion; planning ahead for each particular operation; doing work at the proper time.

Reducing the cost of work stock by carrying the stock on pasture and the minimum of salable feed when they were not at hard work.

EFFECT OF QUALITY OF TOBACCO ON PROFITS.

The farms were classified on the basis of the quality of tobacco as indicated by the selling price. The analysis indicates that this is one of the most important factors determining the net farm returns. The average price for all tobacco sold from the farms studied was 23.3c per pound. The average price received by the best 15 farmers was 28c per pound. The effect of the factor on net earnings is shown in Table 11.

Table 11.—Relation of Price of Tobacco to Profits.

Price of Tobacco	No. Farms	Average Price	Farmer's Net Earnings for Year
18 cents	50	15c	$521
18.1c—22c	46	19c	654
22.1c—26	67	23c	977
26.1c—30c	41	27c	1,512
Over 30c	37	33c	1,735
All farms	241	23c	1,029

The average size of the farms in the five groups in Table 11 was 131.8, 170.7, 152.1, 133.1, and 179.6 acres, respectively.

The farms securing the best price for tobacco had more live stock than the other farms, the animal units per 10 acres of crops for the 5 groups of farms being 3.65, 3.29, 3.74, 3.97 and 4.55 respectively.

DIVERSITY OF ENTERPRISES AS A FACTOR IN PROFITS.

A proper balance between crops and live stock enterprises appears to have an important bearing on farm profits in this area. A comparison of some of these factors for the average of all the farms and the most profitable farms is shown in Table 12.

Table 12.—Division of Farm Receipts Between Crops and Live Stock Enterprises.

	Average of 241 Farms	Average Best 15 Farms
Per cent total receipts from crops	61.9	55.3
Per cent total receipts from live stock	34.5	39.3
Per cent of total receipts from cattle	15.1	21.6
Per cent of total receipts from hogs	15.1	12.7
Per cent of total receipts from sheep	3.6	3.9

The farms were classified on the basis of per cent of total receipts obtained from crops and live stock. Tables 13 and 14 show how these factors are related to profits. It is evident that getting the farm business out of balance either in the direction of overcropping or overstocking results in a decrease in net returns.

Table 13.—Relation of Per Cent of Receipts from Crops to Profits.

Per Cent Receipts from Crops of Total Receipts	No. Farms	Size of Farms	Farmer's Net Earnings for Year
Less than 45.5	48	149	$869
45.5—56.8	50	151	957
56.8—68.1	55	141	1,254
68.1—79.4	49	164	1,152
Over 79.4	39	160	845
All farms	241	152.4	1,029

Table 14.—Relation of Per Cent of Receipts from Live Stock to Profits.

Per Cent Receipts from Live Stock are of Total Receipts	No. Farms	Size of Farms	Farmer's Net Earnings for Year
Under 20.6	49	157	$1,009
20.6—29.2	48	164	1,096
29.2—37.8	44	149	1,144
37.8—46.4	37	140	1,069
Over 46.4	63	149	888
All farms	241	152.4	1,029

RELATION OF SIZE OF BUSINESS TO PROFITS.

The effect of the size of the farm business on profits and other factors was studied in the analyses of these farms and the figures are shown in Table 15.

Table 15.—Relation of Size of Farm to Profits, Labor Efficiency and Other Factors.

	1 to 85 Acres	85 to 120 Acres	120 to 149 Acres	149 to 210 Acres	210 Acres and Over
Number of farms	47	49	48	48	49
Capital	$6,265	$11,242	$15,611	$21,389	$34,465
Net earnings	$886	$1,118	$1,132	$1,137	$883
Acres operated	64.8	103.2	131.2	177.5	280.2
Value land and bldgs. per acre	$87	$93	$103	$107	$109
Man equivalent	1.43	1.55	1.88	2.13	2.31
Productive work units per man	193.04	202.23	206.07	214.16	197.77
Horse work units per horse	40.53	39.71	45.16	53.55	51.28
Crop index	90	98	95	94	99
Farm receipts	$1,839	$2,898	$3,390	$4,182	$6,186
Farm expenses	$853	$1,409	$1,676	$2,112	$3,609
Farm receipts per 100 acres	2,838	2,813	2,588	2,362	2,209
Farm expenses per 100 acres	1,316	1,368	1,279	1,193	1,296

TABLE 15—Continued.

	1 to 85 Acres	85 to 120 Acres	120 to 149 Acres	149 to 210 Acres	210 Acres and Over
Expenses per $100 receipts	$46	$45	$49	$50	$58
Per cent bldgs. are of total capital	48.9	38.6	31.3	23.5	23.3
Value of machinery	$233	$402	$514	$496	$795
Per cent machinery is of total capital	3.7	3.5	3.3	2.3	2.3

Farm business analysis surveys made in various parts of the United States during the period of ten or twelve years before the world war showed a tendency for large farms to return better profits on an average than smaller farms. This was notably the case on farms in Scott, Madison and Mason counties in 1914 and on dairy farms in Shelby, Spencer, Oldham and Hardin counties in 1915, and general farms in Kenton county in 1916. Such studies have indicated that large farms gave a larger net profit per acre and a greater number of acres of crops cultivated per man and per work horse and a greater net return per one hundred dollars' worth of labor expended. Investigations showed also that the larger farms secured greater efficiency in the use of capital. They had less of their capital tied up in the farm dwelling, barns, and other ways not directly productive. There was a smaller investment in machinery per acre on the larger farms and while they had a more adequate line of machinery to care for the crops the machinery cost per unit of product was less than that on the smaller farms.

Studies made in Kentucky and other states during the post-war period of depression showed that the larger farms made smaller net earnings than did the smaller ones. This was probably due to the fact that farm products were at a lower relative price than the things which farmers purchased and the larger farms had relatively greater expenses for hired labor and for other items. The statement is probably justified that during the period of rising prices large farms tend to be more profit-

able but during a period of falling prices this tendency is reversed.

From the analysis of the farms of the Mason and Fleming area it appears that the factor of size did not exert as much influence on profits as did volume of sales per one hundred acres, crop yields and some other factors. The classifications on size in acres and on capital investment both showed that the largest farms did not give as good net earning as the smaller ones. The table shows that the largest farms had higher expenses per one hundred dollars of receipts than did the smaller farms. They also had better crop yields due probably to the fact that a greater proportion of their area was kept in grass. They showed an advantage in the number of productive work units per man and the number of productive horse work units per horse.

The best size of farm is that which provides full employment for men, horses and machinery. A farm utilizing the full time of two men and five horses is in a number of respects the most efficient in size. On a farm of this size a large part of the farm work is done by the proprietor who is a worker as well as a manager. Larger farms on which much hired help is employed have been under a serious disadvantage under deflation conditions and many of them showed very heavy losses.

THE MOST PROFITABLE FARMS.

The analysis of these farms shows that the most important factors influencing farm profits in this area for the period studied were: (1) labor efficiency as indicated by the productive work units accomplished per man; (2) large volume of receipts per one hundred acres; (3) good crop yields; (4) good returns per live stock unit; (5) effective control of expenses, as measured by the percentage of total expenses to receipts; and (6) quality of tobacco as indicated by the price received per pound.

The farms were classified according to the number of these points in which they were strong, that is, in which they exceeded the average farm on that point by ten per cent or more. The results of this classification are shown in Table 16.

Table 16.—Effect of Number of Strong Factors in the Farm Organization to Profits.*

Number of Strong Factors	Number of Farms	Farmer's Net Earnings for Year
No strong factors	47	$109.00
One strong factor	65	667.00
Two strong factors	66	1,253.00
Three strong factors	45	1,740.00
Four or more strong factors	18	2,172.00
All farms	241	1,029.00

*Factors are (1) labor efficiency as indicated by the productive work units accomplished per man, (2) receipts per 100 acres, (3) crop yields, (4) returns from live stock, (5) control of expenses as measured by percentage of expenses to receipts, (6) quality of tobacco as indicated by the price per pound. "Strong" factors are those better then the average by 10% or more.)

Forty-seven farms were not outstanding in any one of these six points. These gave net earning of $109.00 for the year's work and management of their operators. There were sixty-five farms that were strong in one point. The net earnings on these averaged $667.00.

There were 66 farms which were strong in two points. These gave net earnings of $1,253. Forty-five farms were strong in three points and these returned net earnings of $1,740. Eighteen farms were strong in four or more points. The net earnings on these farms average $2,172.

IMPORTANCE OF A WELL-BALANCED FARM.

The preceding table indicates the importance of a well-balanced farm. It is not merely good crop yields, or high yielding live stock or high priced tobacco which determine profits. Very often a farmer overemphasizes or makes a hobby of one factor and neglects other vital factors. Such farmers should bend their efforts toward strengthening the points of the business in which they are weak rather than spending additional effort on the

point in which they already excel. If a farm is strong in the six points or a majority of them it is almost certain to return a profit.

It will be valuable for any farmer to compare his farm with the average farm and the best 15 farms as shown in Table 17.

Table 17.—Farm Business Analysis, Mason and Fleming Counties, Kentucky, Year Ending January 1, 1923.

Name..... P. O.....

Comparison of Your Farm with 241 Farms and Best 15 Farms.

	Your Farm	Average of 241 Farms	Average Best 15 Farms
Net earnings for year's work and management*		$1,029	$3,203
Total acres in farm		152	185
Total capital		$17,928	$21,753
Acres in crops		65	84
Acres in pasture		78.6	88
Total farm receipts		$3,714	$7,124
Total farm expenses		$1,941	$3,038
Receipts per 100 acres in farm		$2,443	$3,851
Expenses per 100 acres in farm		$1,277	$1,642
Expenses per $100 income		$52	$42
Yield of corn per acre		35.2	41.3
Yield of tobacco per acre		1,094.1	1,192.3
Yield of wheat per acre		12.4	15.4
Yield of hay per acre		1.4	1.3
Yield of all crops (Community average 100%)		100%	105%
Returns per productive animal unit		$52.86	$76.03
Returns per $100 feed fed		$103.60	$151.19
Feed cost per animal unit		$50.31	$41.15
Productive animal units per 10 acres of crops		3.75	4.26
Productive day's work per man		203.26	258.01
Productive day's work per horse		47.	56.21
Per cent total receipts from crops		61.9%	55.3%
Per ct. total receipts from live stock		34.5%	39.3%
Per cent of total receipts from cattle		15.1%	21.6%

	Your Farm	Average of 241 Farms	Average best 15 Farms
Per cent of total receitps from hogs		15.1%	12.7%
Per cent of total receipts from sheep		3.6%	3.9%
Per cent of live stock receipts from cattle		43.8%	51.7%
Per cent of live stock receipts from hogs		43.9%	35.3%
Per cent of total receipts from tobacco		53.1%	50.0%
Price per lb. for tobacco		23.3c	28c
*Includes value of products farm furnished the family		332	422

Part II—Physical and Economic Conditions of the Region.

DESCRIPTION OF THE REGION.

Mason and Fleming counties occupy the northeastern border of the Central Kentucky Bluegrass Region. The Ohio River forms the northern boundary of the two counties. The region is one of the most prosperous in Kentucky. It is noted for its commodious farm homes, its well constructed barns and other farm buildings, its well cultivated fields, the excellence of its live stock, and the beauty of its landscape.

The area occupies one of the oldest settled regions of Kentucky. The first white explorer entered Mason County prior to 1775. In the latter year a party headed by Simon Kenton descending the Ohio River, landed at the mouth of Limestone Creek at the present site of Maysville, and explored the country several miles back from the river. In 1784 several settlements were founded, and these had to be strongly fortified against the Indians who continued to wage warfare until 1800.

The early settlers were mostly from Pennsylvania, Virginia and New Jersey. Later many Irish and German immigrants came into the region.

New Orleans was the early market for surplus products which were floated down the Ohio and Mississippi Rivers on flatboats. The crews returning brought sugar, coffee, molasses and other supplies from that city.

The principal original timber of the area was walnut, sugar-tree, ash, elm, oak and hickory. The first crops grown were small patches of corn, wheat, flax, hemp and tobacco, which were principally for home use.

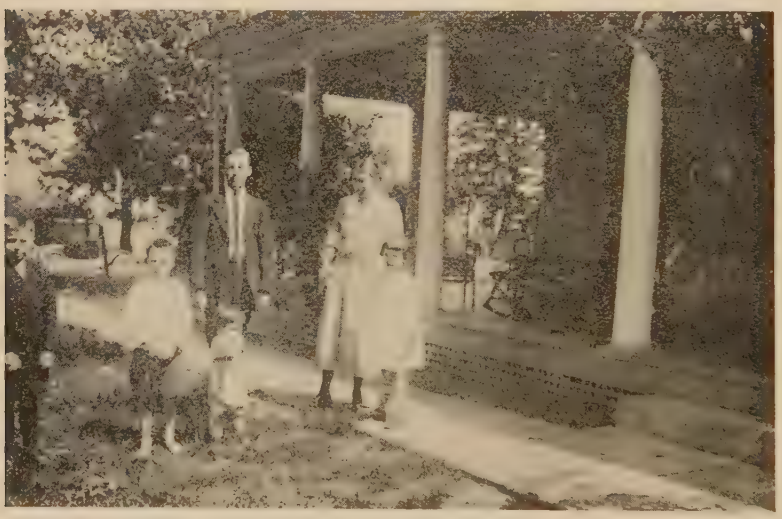

Fig. 3. Farm house and family in the area studied.

Mason County is the first county in Kentucky in which tobacco growing became an important industry. The county also has the distinction of being one of the two original white burley counties. The white burley variety of tobacco was originated in Brown County, Ohio, in 1866, and very shortly thereafter was taken up by growers in Mason and Bracken counties whence it spread to other counties, finally replacing all other types of tobacco in the region.

The production of burley tobacco was confined for many years mainly to Mason, Bracken, Robertson and other hill counties, and it was only in the last quarter of the 19th century

that the crop came to occupy its present large place on farms of the richer and more level counties of the Central Bluegrass Region.

The population of Mason County in 1919 was 17,760, of whom 6,107 lived in the city of Maysville. The population of Fleming County in 1919 was 15,614, of whom 1,562 lived in Flemingsburg, the county seat. The two towns mentioned are the only important centers of population altho there are numerous hamlets of which Mayslick, Washington, Orangeburg, Lewisburg, Dover, Germantown, Minerva and Sardis are the most important in Mason County and Ewing and Elizaville in Fleming County.

Table 18 presents statistics of the farms and farm operators for the two counties as shown by the 1920 report of the U. S. Bureau of the Census. Of the 2,191 farmers reported in the census for Mason County, 1,972 were native whites, 26 foreign born whites and 193 colored. There were 1,045 farms operated by owners, 1,141 by tenants and 5 by managers. Of the 3,123 farmers in Fleming county 3,031 were native whites, 10 foreign born whites and 82 colored. There were 1,807 farms operated by owners, 1,301 by tenants and 15 by managers.

Table 18.—Farms and Operators in Mason and Fleming Counties.

1920	Mason	Fleming
Number of farms	2,191	3,123
Number of farmers	2,191	3,123
Native white	1,972	3,031
Foreign born white	26	10
Colored	193	82
Farms operated by owners	1,045	1,807
Farms operated by tenants	1,141	1,301
Farms operated by managers	5	15
Land in farms (Acres)	143,782	204,178
Improved land in farms	130,508	156,270
Average acreage of land per farm	65.6	65.4
Average acreage of improved land per farm	59.6	50
Value land and buildings per farm	$10,143	$5,458
Value land and buildings per acre	$154.62	$83.45
Value of land alone per acre	$125.46	$67.43

In educational matters this section occupies a leading position. This is particularly true of Mason County which has attained a wide reputation for the excellence of its rural consolidated schools.

The two principal local buying markets are Maysville, located on the Ohio River, in Mason County, and Flemingsburg located in the east central part of Fleming County. Maysville

Fig.

has some wholesale and jobbing interests but the principal wholesale buying markets for the area are Cincinnati about 75 miles distant and Lexington about 56 miles distant from the center of the area. Maysville for a long time has been one of the most important burley tobacco markets of Kentucky, the greater part of the tobacco grown in these two counties and adjoining counties being delivered to that market. In 1919 deliveries to Maysville amounted to 19,009,415 pounds which sold for $4,398,779. Flemingsburg is a less important market and receiving point for burley tobacco. The deliveries in that market in 1919 amounted to 1,377,550 pounds and brought $298,377.

The live stock sold from this region go mainly to the Cincinnati market.

The transportation facilities for the region are furnished by the trunk line of the Chesapeake & Ohio Railroad running between Cincinnati and Washington, D. C., and by the Maysville and Lexington division of the Louisville & Nashville Railroad. A branch line railroad connects the latter with Flemingsburg six miles away. River transportation is made available by boats plying on the Ohio River.

Both Mason and Fleming counties have a fair system of macadamized roads. Within the last few years, however, these roads have proved unequal to the heavy automobile and truck traffic and are at present in a rather poor condition. The road problem is one of the most difficult problems of the region.

TOPOGRAPHY AND DRAINAGE.

Mason County contains 143,782 acres of land in farms of which 130,508 acres are improved land. Fleming County has 204,178 acres in farms, and 156,270 acres of improved land. The surface of the region is hilly and undulating, rising several hundred feet above the Ohio and Licking Rivers and their tributary creeks which cut up the surface into a succession of ridges and ravines. Back from the rivers the land becomes less rolling and the ridges are broader and well adapted to agricultural purposes.

The Licking River forms the southern boundary of Fleming County and with its tributaries carries the greater part of the drainage of the county.

The rolling topography of the land has made it subject to disastrous erosion, and there are considerable areas from which the soil has washed in gullies down to the underlying rock. Some of this land can no longer be cultivated and must be left in permanent grass. The best farmers in the section keep the land in grass most of the time and devote a minimum acreage to intertilled crops.

SOILS AND GEOLOGY.

Most of the land in Mason and Fleming counties is in the Cincinnatian limestone area. The soils are similar in origin and character to those of Shelby County. In fertility and productiveness they are second only to the rich Trenton limestone soils of Fayette and the immediately adjoining counties.

The U. S. Bureau of Soils has indicated two principal soil types of which the Hagerstown clay occupies about 4/5 of the area and the Hagerstown loam a little less than one-fifth. Of these two types the Hagerstown loam is considerably the richer. This soil type is found in the country surrounding Mayslick and Helena Station and approaches the villages of Washington and Lewisburg. It occurs in trough-like depressions in relation to the general topography of the uplands. It is gently rolling, is well drained and does not wash as badly as the Hagerstown clay. It has a larger amount of organic matter in it than does the latter, and is the best soil in the two counties for general farming.

Surrounding the Hagerstown loam is the Hagerstown clay which occupies the greater part of the area in both Mason and Fleming counties. It is a heavy brown or yellow loam, occupying the more rolling parts of the uplands. The top soil is more shallow, less porous and does not work as easily as does the loam soil. The eastern part of Fleming County is occupied by the Silurian soil, which is much thinner than the types in the remaining part of the area. It is deficient in lime and phosphorus, is less productive and has a considerably lower value than the other soils. Only a small number of the farms in this study were located on this soil type.

Table 18.—Pounds of Plant Food Per Acre in Surface Soils of Mason and Fleming Counties.*

Location of Soil	Total Nitrogen	Total Phosphorus	Easily Soluble Phos.	Total Potassium	Easily Soluble Potassium	Easily Soluble Calcium
Near Mayslick Mason County	3,200	2,060	34	32,600	180	3,450
Near Helena Mason County	4,940	4,000	290	34,400	314	7,460
Near Johnson Fleming Co.	4,240	3,000	228	30,400	1,070	3,800
Near Ewing Fleming Co.	2,640	2,236	168		322	3,040

*Figures furnished by Dr. A. M. Peter, Head, Dept. of Chemistry, Ky. Agricultural Experiment Station and Prof. S. C. Jones, Extension Specialist in Soils, College of Agriculture, University of Kentucky.

Table 18 shows analyses of four typical soil samples from the parts of the region in which most of the business analysis records were obtained. It will be noted from the analyses that these soils are liberally supplied with lime and phosphorus. In the latter element they are not as rich as the Trenton limestone of the Central Bluegrass counties but are very much richer in phosphorus than the soils of a large part of the state. On the surface of many of the slopes are limestone fragments, and here alfalfa and sweet clover grow naturally and luxuriantly. There is less lime in the soils of the ridges and the application of limestone is necessary for the best growth of alfalfa and red clover. Many farmers are now applying ground limestone with very excellent results.

CONDITIONS AFFECTING THE AGRICULTURE OF THE AREA.

The interests of this area are almost exclusively agricultural, and center around the production of tobacco, grass, corn, small grain, livestock and live stock products. Table 19 shows the acreages of the principal crops of the two counties from 1880 to 1920, and Table 20 the numbers of the various classes of live stock produced from 1840 to 1920.** It will be noted that there was a large increase in the acreage of tobacco and a marked decline in the acreage of wheat and oats during the period. The acreage of corn did not change greatly. There was a very marked decrease in the numbers of sheep and hogs, a small decrease in horses and a large increase in dairy cattle and a decrease in other cattle.

**Figures for early census years furnished by Mr. H. R. Tolley, Bureau of Agricultural Economics, U. S. Department of Agriculture.

Table 19.—Acreage of Principal Crops of Mason and Fleming Counties From 1880 to 1920.
(U. S. Census Data)

Mason County.

Year	Corn Acres	Wheat Acres	Rye Acres	Barley Acres	Oats Acres	Hay and Forage Acres	Tobacco Acres
1880	25,619	19,361	769	740	1,055	4,308	5,495
1890	23,720	15,726	1,735	46	2,198	8,077	7,783
1900	22,151	17,002	113	3	188	7,989	7,409
1910	22,831	8,497	1,034	.....	201	9,915	8,439
1920	20,274	10,897	546	3	441	8,820	8,605

Fleming County.

1880	26,552	16,819	698	10	4,583	5,386	1,548
1890	25,883	10,802	875	1	6,256	9,181	4,350
1900	30,041	13,230	111	.....	2,544	21,190	4,395
1910	30,013	7,440	529	.....	1,542	13,377	7,394
1920	26,637	9,396	482	59	2,929	10,889	6,925

Table 20.—Live Stock in Mason and Fleming Counties 1840 to 1920.
(U. S. Census Data)

Mason County.

Year	Horses	Sheep	Swine	Total Cattle	Milk Cows	Other Cattle
1840	7,791[2]	21,340	29,544	11,315		
1850	5,320	14,584	27,584	9,960	3,465	6,040
1860	6,536	10,501	33,050	10,706	3,747	6,372
1870	4,132	5,659	18,202	7,819	2,598	4,962
1880	4,890	7,446[3]	26,824	9,613	3,846	5,728
1890	6,045	13,802	22,770	10,696	3,675	7,021
1900	5,500	29,387	20,938	12,814	3,460[4]	9,354
1910	5,465	17,005	22,818	10,854	3,549[4]	7,305
1920	6,292	6,004	25,515	23,520	8,039	

Table 20.—Continued.
Fleming County.

1840	7,156[2]	18,280	32,677	10,848		
1850	5,309	17,818	32,142	10,648	3,753	6,427
1860	5,206	10,969	25,144	8,203	2,882	4,716
1870	4,705	9,552	19,004	8,934	2,915	5,618
1880	5,031	9,530[3]	20,274	9,840	3,101	6,596
1890	5,799	12,469	17,279	12,068	3,725	8,343
1900	6,338	18,257	18,976	15,355	3,787[4]	10,568
1910	7,255	18,446	17,200	12,526	4,197[4]	8,329
1920	6,020	9,625	12,684	11,830	7,398[4]	4,432

[2] Include mules.
[3] Exclusive of lambs.
[4] Dairy cows.

The average size of the 241 farms in the survey was 152 acres, of which 65 acres were in crops, 78.6 acres in pasture, the remainder being occupied by buildings, roads, lanes, and waste land. Acreages of crops grown are shown in Table 21.

Table 21.—Crops on Average Farm in Mason and Fleming Area in 1922 and Crop Yields Compared with Five-Year Average.

Crop	Acreage for 241 Farms	1922 Yield for 241 Farms	Average Yield for Farms in Two Counties
			1880 to 1920 5 Census Years
Tobacco	7.63 acres	1,094.1 lbs.	972 lbs.
Corn	20.70 acres	35.2 bu.	39.4 bu.
Wheat	14.72 acres	12.4 bu.	15.25 bu.
Rye	2.18 acres	9.7 bu.	9.9 bu.
Hay	13.47 acres	1.4 tons	.95 tons
Other crops	6.3 acres		

Farmers in this region do not follow any fixed crop rotation. A common practise is to break a field out of sod, planting the best land of the field in tobacco and the remainder in corn. The field is usually sown to wheat or rye in the fall. Most farmers seed the land to clover and timothy leaving it in hay and pasture

from 2 to 5 years. On exceptionally good land farmers often grow two crops of tobacco or corn before seeding down to small grain and grass. When this is done grass usually remains for a longer period and bluegrass is usually included in the seeding. The land on smaller farms is usually plowed every 4 or 5 years on an average, but on the larger farms the interval between cultivated crops is considerably longer.

The corn acreage is limited to the amount of corn required to furnish grain for the work stock, the farm meat hogs, for silage in some cases, for a limited number of fat hogs sold on the market and in a few cases for steer feeding. Fat hogs and cattle for the market are mainly found on the richer farms having the leveler loam soils previously described.

As a rule little more hay is cut than that necessary for the work stock and farm milk cows. The remainder of the timothy and clover fields is grazed. Since there is a deficiency in hay and grain which is supplied by products shipped in, local feed prices are high and this definitely limits the live stock enterprises.

LIVE STOCK ENTERPRISES.

The live stock on the 241 farms averaged as follows: dairy cattle, 4.97 head; beef cattle, 3.68 head; young cattle, 5.28 head; bulls, 3 head; work stock, 4.07 head; sheep, 20.97 head; brood sows, 4 head; other hogs, 35 head; chickens, 192; other live stock .6 of a unit.

The sale of hogs furnished 15.1% of the total revenues of the 241 farms, dairy products, dairy cattle and beef cattle 15.1%; sheep 3.6%; tobacco 53.1%; and other crops, principally wheat, 9%.

A considerable portion of the farms have a small quota of cows of the general purpose type from which they raise calves and sell some surplus butter fat. The stock raised may be sold as butcher cattle or as stocker cattle. Some farmers buy stock cattle for fattening. The principal function of the cattle raising is the utilization of the available grazing and farm roughage, the latter consisting principally of corn stover and a limited amount

of hay. Since the local supply of corn is distinctly limited not much grain is fed to steers and most of the steers sold are fattened on grass. Scarcity of corn also has resulted in limiting the fattening of hogs to the number required for the home meat supply with a small surplus for sale.

Dairy cattle have increased in the area to a marked extent, especially on the smaller farms. Beef cattle and sheep are kept mainly on the larger farms. Cream for butter making is the principal dairy product sold. The greater part of the cream is marketed at a large cooperative factory at Maysville, most of the remainder being shipped to creameries at Cincinnati. There is an increasing number of breeders of purebred dairy cattle and the area has begun to attract outside buyers of registered Jerseys. Mules and horses are raised in sufficient numbers to supply the local work stock needs with normally a surplus for outside markets.

WEATHER CONDITIONS.

Table 22.—Precipitation and Temperature Data for Mason-Fleming Area.

Month	Precipitation		Mean Temperature 1899-1916 Degrees
	Mean Inches	1922 Inches	
January	4.37	2.17	33.3
February	3.75	3.30	31.7
March	5.04	8.40	44.1
April	3.65	4.43	53.4
May	4.19	3.12	64.7
June	4.76	1.49	72.6
July	4.78	2.25	76.8
August	4.01	3.41	75.2
September	2.73	2.05	68.9
October	2.59	3.05	56.7
November	3.09	1.30	44.4
December	3.97	5.40	34.1
Annual	46.93	40.37	54.6

Table 22 shows precipitation and temperature records for the Mason-Fleming area. The normal figures represent an average of the years 1899 to 1916 inclusive. Weather records have been kept during that period at Maysville and Mt. Sterling. The former is located at the north of the area, the latter at the south of the area. An average was struck between the records of the two stations and the average figure used.

Figure 1 shows the normal precipitation and temperature for the region and Figure 2 shows the 1922 precipitation compared with the normal. The last killing frost occurred at Maysville March 23 and at Mt. Sterling April 23. The first killing frost in the fall occurred at both weather stations October 13.

The rainfall for the area was comparatively heavy during the spring months but was very deficient from May until October. The yield of corn was severely cut by the prolonged drought. The tobacco yield was also cut but the quality of the crop was improved by the dry weather which prevailed during the curing process. Pastures were severely cut by the summer drought.

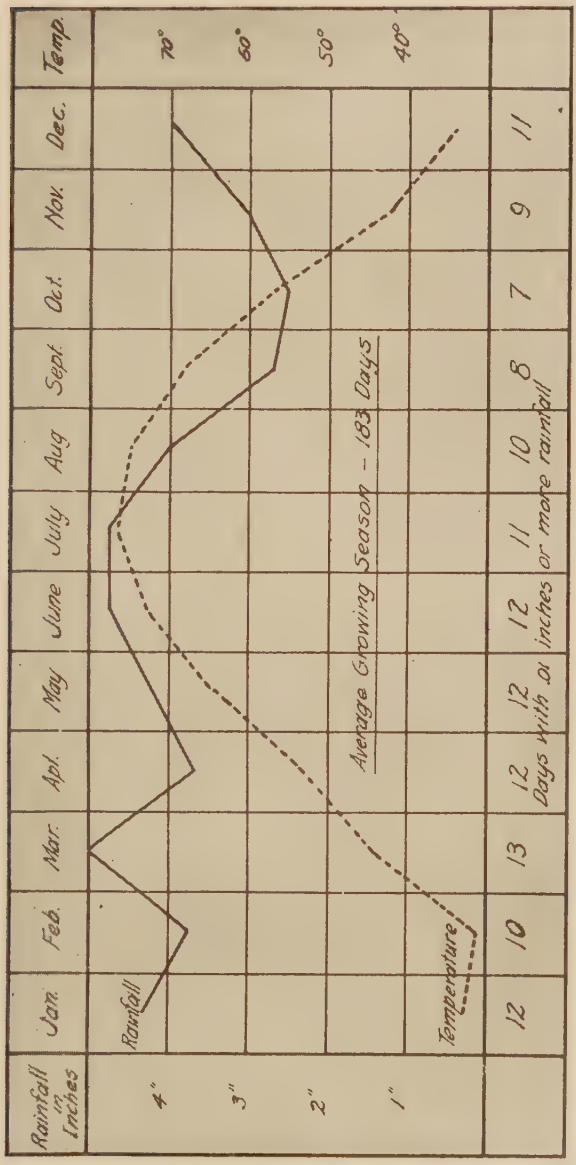

Fig. 5. Normal rainfall and temperature averages for the years 1899 to 1916, inclusive.

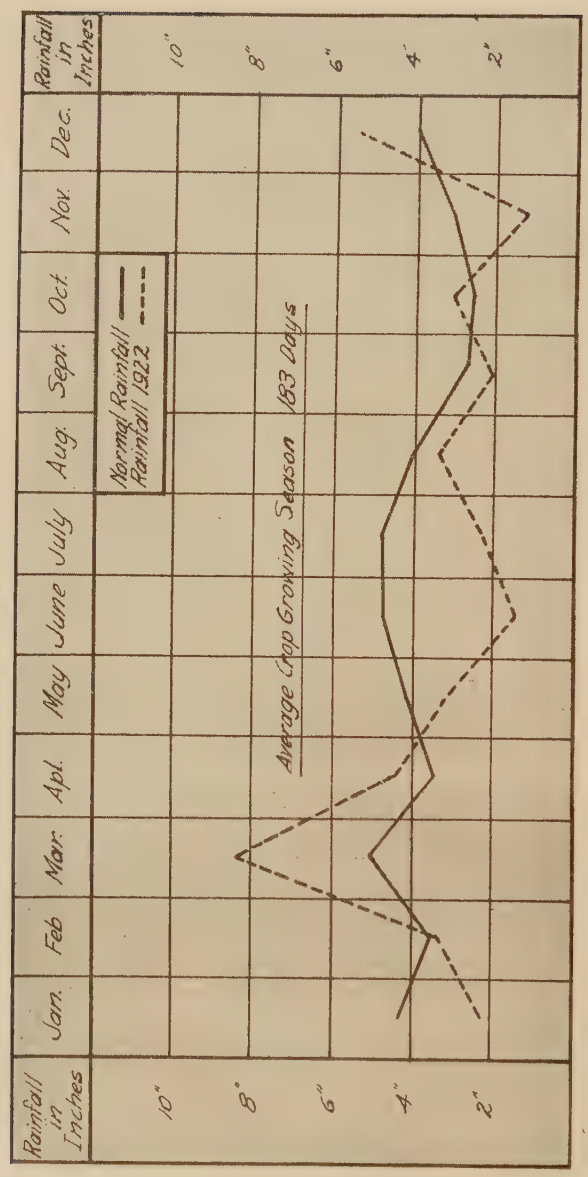

Fig. 6. Rainfall in 1922 compared with the normal.

Part III—Successful Individual Farms.

An analysis of the organization of individual farms is valuable in suggesting ways of improving that of other farms in the section in which they are located. The farms of the Mason-Fleming area whose business organization is here shown are typical of the farms which earned the largest profits. It will be noted that these farms were outstanding in most of the efficiency factors which have been previously discussed, altho by no means all of them were outstanding in all those factors.

SUCCESSFUL DIVERSIFIED FARM WITH TOBACCO, WHEAT, HOGS AND BEEF CATTLE AS MAJOR ENTERPRISES.

Farm No. 4—310 acres—Net earnings $3,265

Total investment	$50,898
Principal Items—	
Land and buildings	$46,500
Steers	840
Dairy cows	135
Hogs	574
60 hens	48
8 work stock	1,225
Machinery	950

Total receipts	$9,947
Principal Items—	
Tobacco	$3,666
Tobacco (cropper's)	2,295
Wheat	756
Beef cattle	1,490
Hogs	1,401

Principal Crops—	Yield Per Acre
45 A. corn	65 bu.
10 A. cropper's corn	40 bu.
8 A. tobacco	1,437 lbs
5 A. cropper's tobacco	1,440 lbs.
40 A. wheat	18 bu.
10 A. clover and timothy	1 ton

Total expenses	$4,201
Principal Items—	
Cropper labor	$2,032
Unpaid family labor	360
Repairs	350
Seed	201
Threshing and twine	87
Taxes and insurance	465
Depreciation	455

Productive work units per man	327
Receipts per 100 acres	$3,209
Crop index	149
Returns per live-stock unit	$70

Operating expenses per $100 receipts	$42
Price per lb. for tobacco	31c
Per cent of receipts from crops	68.8
Per cent of receipts from live stock	25.8

This is one of the larger farms in the survey. Besides 6% interest on the investment the operator earned $3,265 for his year's labor and management. Of this $393 represented the value of the things furnished by the farm to the family living. The strong points of the farm are the excellent crop yields, economy in control of expenses, an extra good price for tobacco, and excellent labor efficiency.

SUCCESSFUL DAIRY FARM.

Farm No. 6—210 acres—Net earnings $3,470

Total investment	$39,364
Principal Items—	
Land and buildings	$31,500
30 purebred jersey cows and breeding stock	4,400
Hogs	185
100 hens	100
5 head work stock	450
Machinery and equipment	1,196

Principal Crops—	Yield Per Acre
13 A. corn	35 bu.
12 A. silage corn	10 tons
20 A. clover and timothy	1 ton
5 A. tobacco	1,500 lbs.
4 A. apples and peaches.	

Productive work units per man	213
Receipts per 100 acres	$5,243
Crop index	99
Returns per live-stock unit	$249
Returns per $100 worth feed fed	$319

Total receipts	$11,010
Principal Items—	
Milk & cream (retail)	$7,236
Dairy stock	2,200
Tobacco	938
Hogs	489
Poultry	248
Fruit	200

Total expenses	$6,171
Principal Items—	
Maintenance of retail dairy equipment	$2,516
Hired labor	1,160
Unpaid family labor	360
Feed purchased	960
Taxes and insurance	298

Operating expenses per $100 receipts	$56
Price per lb. for tobacco	12c
Per cent of receipts from crops	10.3
Per cent of receipts from live stock	89.6

This was a specialized dairy farm on which the retailing of milk and the breeding of registered dairy cattle were the principal sources of income. Tobacco and hogs were minor enterprises. The strongest point of the farm was the high returns from the dairy herd. The quality of the stock is shown by the returns per head and per $100 worth of feed fed. These factors are of course larger than they would be normally because of the high gross returns from milk sold at retail.

SUCCESSFUL DIVERSIFIED FARM.

Farm No. 3—248 acres—Net earnings $3,262

Total investment	$44,363
Principal Items—	
Land and buildings	$37,200
18 dairy cows & young stock	1,230
Brood sows and hogs	400
500 hens	750
7 work horses	520
Machinrey (including tractor)	2,493

Principal Crops—	Yield Per Acre
37 A. corn	30 bu.
35 A. cropper's corn	35 bu.
8 A. silage corn	9 tons
20 A. wheat hogged down.	
30 A. clover hay	1 1/3 tons
4 A. tobacco	1,150 lbs.
10 A. cropper's tobacco	1,000 lbs.
2 A. truck.	

Total receipts	$10,202
Principal Items—	
Tobacco	$1,150
Tobacco (cropper's)	2,500
Poultry and eggs	1,772
Hogs	1,712
Cream and young stock	1,825
Truck	200

Total expenses	$4,843
Principal Items—	
Cropper labor	$1,650
Feed	1,000
Hired labor	683
Taxes and insurance	526
Seed	126
Repairs	125

Productive work units per man	349
Receipts per 100 acres	$4,114
Crop index	93
Returns per productive live-stock unit	$79
Operating expenses per $100 receipts	$48
Price per lb. of tobacco	25c
Per cent of total receipts from crops	43.3
Per cent of total receipts from live stock	52.2

The leading enterprises on this farm were tobacco, poultry, dairy cattle and hogs. An excellent showing was made on the factor of labor efficiency, this being due to the fact that the dairy herd gave employment to the farm labor before and after the work in the fields and during the winter. Other strong factors were the returns per live-stock unit, the control of expenses, and the price of tobacco.

SUCCESSFUL 200-ACRE FARM.

Farm No. 72—200 acres—Net earnings $3,835

Total investment	$21,336	Total receipts	$6,630
Principal Items—		Principal Items—	
Land and buildings	$20,000	Tobacco	$3,837
Heifers	768	Tobacco (cropper's)	1,300
Hogs	220	Hogs	643
200 hens	200	Cattle	728
Implements	305		
5 head work stock	400		
	Yield Per	Total expenses	$2,240
Principal Crops—	Acre	Principal Items—	
11 A. corn	40 bu.	Cropper labor	$698
4 A. corn (cropper's)	40 bu.	Hired labor	600
25 A. rye	7 bu.	Feed	65
16 A. timothy	1 ton	Repairs	99
9 A. tobacco	1,111 lbs.	Seed	134
3½ A. tobacco (cropper's)	939 lbs.	Taxes and insurance	216
Productive work units per man	232	Operating expenses per $100 receipts	$34
Receipts per 100 acres	$3,315	Price per lb. for tobacco	39c
Crop index	85	Per cent of total receipts from crops	78.2
Returns per live-stock unit	54	Per cent of total receipts from live stock	20.5

One very significant point in the organization and management of this farm was the economy of operation. Only $34 out of each $100 of receipts were spent for operation. Another outstanding factor was the quality of tobacco. The farm was also strong in receipts per 100 acres.

SUCCESSFUL DIVERSIFIED FARM OF MEDIUM SIZE.

Farm No. 187—140 acres owned and 20 acres cash rented—Net earnings $3,320

Total investment	$19,993	Total receits	$5,987
Principal Items—		Principal Items—	
Land and buildings	$16,800	Tobacco	$1,875
8 cows	450	Cropper's tobacco	1,050
8 brood sows	185	Wheat	226
8 head of work stock	650	Hogs	1,174
Implements	834	Cream and young dairy stock	594

Principal Crops—	Yield Per Acre
35 A. corn	55 bu.
20 A. wheat	10 bu.
20 A. timothy	1½ tons
10 A. tobacco	1,000 lbs.
5 A. tobacco (cropper's)	1,120 lbs.

Total expenses	$2,129
Principal Items—	
Cropper labor	$525
Hired labor	108
Unpaid family labor	360
Feed	65
Repairs	105
Seed	87
Threshing	76
Taxes and insurance	295
Depreciation	283

Productive work units per man	342
Receipts per 100 acres	$3,742
Crop index	133
Returns per live-stock unit	$52

Operating expenses per $100 receipts	$36
Price per lb. for tobacco	19c
Per cent of receipts from crops	59.3
Per cent of receipts from live stock	26.6

Strong points of this farm were its excellent crop yields, diversity of enterprises, efficiency of labor, and control of expenses. In the two last named factors the farm was especially outstanding. Most of the farm work was done by the proprietor and members of his family.

SUCCESSFUL SMALL FARM.

Farm No. 2—128 acres—Net earnings $2,966

Total investment	$28,914
Principal Items—	
Land and buildings	$25,600
2 cows	120
22 sheep	560
4 brood sows	140
Implements	630
Work stock	850
150 hens	150

Total receipts	$6,879
Principal Items—	
Tobacco (wage)	$2,401
Tobacco (cropper's)	2,041
Lambs and wool	715
Hogs	633
Cream and dairy stock	319

Principal Crops—	Yield Per Acre
31 A. corn	50 bu.
8 A. corn (cropper's)	50 bu.
6 A. wage tobacco	1,650 lbs.
6 A. cropper's tobacco	1,313 lbs.
24 A. clover and timothy	1½ tons
4 A. cowpeas hogged down.	

Total expense	$2,907
Principal Items—	
Cropper labor	$1,273
Hired labor	600
Taxes and insurance	265
Purchased feed	110
Repairs—horseshoeing	40
Depreciation on bldgs. and machinery	288
Unpaid family labor	300

Productive work units per man	176
Receipts per 100 acres	$5,371
Crop index	126
Returns per live-stock unit	$78

Operating expenses per $100 receipts	$42
Price per lb. for tobacco	25c
Returns per $100 worth of feed fed	$122
Per cent of total receipts from crops	69.3
Per cent of total receipts from live stock	23.3

The outstanding point of this farm was the large volume of receipts. These were more than twice the average for all the farms. This excellent showing was due mainly to the tobacco crop, which produced a large yield and sold at an excellent price. The yield of all crops was 26% better than the average for the community. The returns per live-stock unit and feeding efficiency were also better than the average.

Second only to the excellent showing made by the tobacco enterprise was that made in the control of expenses, which were 42c for each dollar of receipts as against 52c for the average of the 241 farms.

SUCCESSFUL DIVERSIFIED FARM WITH TOBACCO, SHEEP, HOGS AND BEEF CATTLE AS MAJOR ENTERPRISES.

Farm No. 5—300 acres—Net earnings $3,250

Total investment	$43,985	Total receipts	$10,541
Principal Items—		Principal Items—	
Land and buildings	$37,500	Tobacco	$675
16 steers & other beef cattle	1,160	Tobacco (cropper's)	4,200
5 dairy cows	300	Sheep and wool	1,305
82 ewes	820	Hogs	1,389
4 brood sows and other hogs	345	Cream and butter	335
125 hens	125	Beef cattle	614
5 work horses	660	Eggs and poultry	421
Machinery	1,060		

Principal Crops—	Yield Per Acre		
25 A. corn	40 bu.	Total expenses	$5,519
24 A. corn (cropper's)	30 bu.	Principal Items—	
20 A. rye—pastured.		Cropper labor	$2,338
25 A. clover and timothy.		Wage labor	563
2½ A. tobacco	1,000 lbs.	Unpaid family labor	345
14 A. tobacco (cropper's)	1,000 lbs.	Feed purchased	253
		Repairs	215
		Taxes and insurance	495
		Depreciation	516

Productive work units per man	169	Operating expenses per $100 receipts	$52
Receipts per 100 acres	$3,861	Price per lb. for tobacco	30c
Crop index	111	Per cent of receipts from crops	48.9
Returns per live-stock unit	$57	Per cent of receipts from live stock	42.5
Returns per $100 worth of feed fed	$137		

The strong ponts of this farm were good crop yields, a good price for tobacco, good volume of receipts per 100 acres of land, good live stock and good feeding efficiency. In control of expenses the farm made an average showing.

SUCCESSFUL 218 ACRE DIVERSIFIED FARM.

Farm No. 232—218 acres—Net earnings $2,199

Total investment	$48,339	Total receipts	$8,238
Principal Items—		Principal Items—	
Land and buildings	$43,600	Tobacco	$2,585
5 cows	250	Tobacco (cropper's)	2,325
20 steers and heifers	1,300	Dairy products and young stock	601
28 ewes	308	Beef cattle	504
8 brood sows and other hogs	512	Sheep	444
6 work stock	700	Hogs	1,481
Implements and machinery	710		

Principal Crops—	Yield Per Acre	Total expenses	$3,984
22 A. corn	45 bu.	Principal Items—	
10 A. silage corn	10 tons	Cropper labor	$1,205
3 A. corn (cropper's)	45 bu.	Wage labor	950
20 A. wheat hogged down.		Feed (corn 840 bu. and shorts 3 tons)	678
15 A. timothy hay	1 1/3 tons	Repairs and horseshoeing	130
9 A. tobacco	1,223 lbs.	Seed	90
8 A. cropper's tobacco	1,500 lbs.	Fertilizer	128
		Taxes and insurance	392
		Depreciation	321

Productive work units per man	196	Operating expenses per $100 receipts	$48
Receipts per 100 acres	$3,778	Price per lb. for tobacco	21c
Crop index	118	Per cent of receipts from crops	60
Returns per live-stock unit	$104	Per cent of receipts from live stock	34.6

This farm had an excellent diversity of enterprises. Tobacco, hogs, beef cattle, sheep and dairy stock were the five major sources of income. An excellent showing was made on the factors of crop yields and volume of receipts per 100 acres. The surface of this farm is rolling or steep and for this reason the greater part of the land is kept in grass.

SUCCESSFUL 209-ACRE FARM.

Farm No. 69—209 acres—Net earnings $3,263

Total investment	$28,507	Total receipts	$7,445
Principal Items—		Principal Items—	
Land and buildings	$26,125	Tobacco (wage)	$2,120
6 cows and 1 heifer	330	Tobacco (cropper's)	3,260
8 steers	400	Milk and cream	400
50 ewes	625	Lambs and wool	394
4 brood sows and other hogs	215	Hogs	868
100 hens	80	Poultry	270
Machinery	295		

Principal Crops—	Yield Per Acre	Total expenses	$3,416
12 A. corn	40 bu.	Principal Items—	
22 A. corn (cropper's)	40 bu.	Cropper labor	$1,953
28 A. wheat—grazed.		Hired labor	100
15 A. clover and timothy	1.3 tons	Unpaid family labor	180
8 A. wage tobacco	1,000 lbs.	Repairs and horseshoeing	120
3 A. cropper tobacco	850 lbs.	Seed	198
10 A. cropper tobacco	979 lbs.	Taxes and insurance	325
		Depreciation on bldgs. and equipment	290

Productive work units per man	287	Operating expenses per $100 receipts	$46
Receipts per 100 acres	$3,557	Price per lb. for tobacco	26c
Crop index	102	Per cent of receipts from crops	76.6
Returns per live-stock unit	$57	Per cent of receipts from stock	23.4

The outstanding factors of efficiency of this farm were the excellent yield and price of the tobacco crop, the high return per 100 acres operated and the effectiveness with which operating expenses were kept down. The crop index, receipts per live-stock unit and the labor efficiency were also excellent.

A SUCCESSFUL SMALL FARM WITH TOBACCO AND HOGS AS THE CHIEF ENTERPRISES.

Farm No. 1—115 acres—Set earnings $2,990

Total capital	$21,759	Total receipts	$6,327
Principal Items—		Principal Items—	
Land and buildings	$20,000	Tobacco (wages)	$1,737
5 cows	250	Tobacco (cropper's)	1,488
6 brood sows and other hogs	360	Cream and milk	275
3 work horses	265	Hogs	1,751
300 hens	300	Poultry and eggs	355
Machinery	342		
		Total expenses	$2,586
	Yield Per Acre	Principal Items—	
Principal Crops—		Cropper labor	$744
4 A. corn	40 bu.	Wage labor	305
2½ A. silage corn	13 tons	Purchased feed	730
2 A. alfalfa	2 tons	Taxes and insurance	223
15 A. cowpeas	1 ton	Seed	74
8 A. wage tobacco	1,000 lbs.	Depreciation bldgs. and machinery	186
9 A. cropper's tobbaco	1,133 lbs.		
Productive work units per man	256	Operating expenses per $100 receipts	$41
Receipts per 100 acres in farm	$5,502	Price per lb. for tobacco	22c
Crop index	91	Per cent of total receipts from crops	63.6
Returns per live-stock unit	$62	Per cent of total receipts from live stock	34.4

This farm was outstanding in the large volume of receipts per 100 acres. It was also outstanding in the control of expenses and was strong in the factor of returns per live-stock unit. Tobacco and hogs were the principal sources of revenue.

SUCCESSFUL 118-ACRE FARM.

Farm No. 73—118 acres—Net earnings $2,682

Total investment	$19,873	Total receipts	$6,841
Principal Items—		Principal Items—	
Land and buildings	$17,000	Tobacco	$1,113
Dairy cattle	180	Tobacco (cropper's)	3,423
8 brood sows and other hogs	1,220	Hogs	1,792
4 head work stock	500		
Implements	445		

Principal Crops—	Yield Per Acre
6 A. corn	40 bu.
15 A. corn (cropper's)	50 bu.
10 A. rye	10 bu.
12 A. clover and timothy	1 ton
4 A. tobacco	1,325 lbs.
11 A. tobacco (cropper's)	1,173 lbs.

Productive work units per man	229
Receipts per 100 acres	$5,797
Crop index	109
Returns per live-stock unit	$66

Total expenses	$3,504
Principal Items—	
Cropper labor	$1,950
Wage labor	100
Feed	848
Repairs	85
Seed	63
Taxes and insurance	179
Depreciation	245
Operating expenses per $100 receipts	$53
Price per lb. for tobacco	24c
Per cent of total receipts from crops	69.8
Per cent of receipts from live stock	27.7

This farm excelled the average of the section in labor efficiency, receipts per 100 acres, crop yields, returns from live stock and quality of tobacco.